Title (en)

Field effect trench transistor having lightly doped epitaxial region on the surface portion thereof.

Title (de)

Feldeffekttransistor mit Graben mit niedrig dotiertem epitaktischen Gebiet an dessen Oberflächenbereich.

Title (fr)

Transistor à effet de champ à sillon avec une région épitaxiale faiblement dopée ou une partie de sa surface.

Publication

EP 0580452 A1 19940126 (EN)

Application

EP 93305856 A 19930723

Priority

US 91895492 A 19920724

Abstract (en)

A DMOS field effect transistor having its gate electrode located in a trench includes a lightly doped epitaxial layer overlying the usual epitaxial layer. The trench penetrates only part way through the upper epitaxial layer which is more lightly doped than is the underlying lower epitaxial layer. The lightly doped upper epitaxial layer reduces the electric field at the bottom of the trench, thus protecting the gate oxide from breakdown during high voltage operation. Advantageously, the upper portion of the lightly doped upper epitaxial layer has little adverse effect on the transistor's on resistance. <IMAGE>

IPC 1-7

H01L 29/60

IPC 8 full level

H01L 21/336 (2006.01); **H01L 29/423** (2006.01); **H01L 29/78** (2006.01); H01L 29/08 (2006.01)

CPC (source: EP KR US)

H01L 29/0878 (2013.01 - EP US); **H01L 29/78** (2013.01 - KR); **H01L 29/7813** (2013.01 - EP US); H01L 29/4236 (2013.01 - EP US)

Citation (search report)

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- [A] US 4941026 A 19900710 - TEMPLE VICTOR A K [US]
- [X] PATENT ABSTRACTS OF JAPAN vol. 5, no. 121 (E-68)(793) 5 August 1981 & JP-A-56 058 267 (NIPPON DENSHIN DENWA KOSHA) 21 May 1981
- [A] PATENT ABSTRACTS OF JAPAN vol. 5, no. 19 (E-44)(691) 4 February 1981 & JP-A-55 146 976 (NIPPON DENKI) 15 November 1980

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Designated contracting state (EPC)

DE IT NL

DOCDB simple family (publication)

EP 0580452 A1 19940126; **EP 0580452 B1 19970409**; DE 580452 T1 19941006; DE 69309565 D1 19970515; DE 69309565 T2 19970724; JP 3387563 B2 20030317; JP H06224437 A 19940812; KR 100305978 B1 20011215; KR 940003092 A 19940219; US 5532179 A 19960702; US 5910669 A 19990608

DOCDB simple family (application)

EP 93305856 A 19930723; DE 69309565 T 19930723; DE 93305856 T 19930723; JP 20259593 A 19930723; KR 930013750 A 19930721; US 44748495 A 19950523; US 91895492 A 19920724